

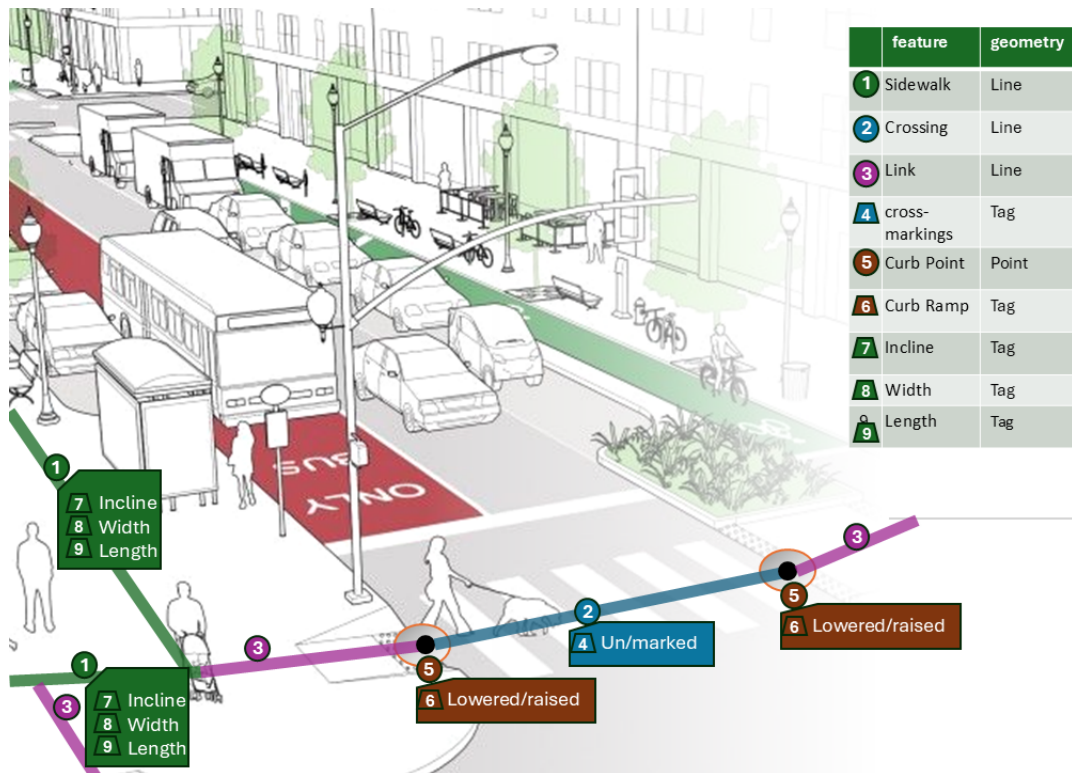
Identification of the Optimal Approach to Maintain Complete Statewide Sidewalk Data

WA-RD 957.1

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February 2026



Washington State
Department of Transportation

Office of Research & Library Services

WSDOT Research Report

Research Report
Agreement T1461, Task AT

Identification of the Optimal Approach to Maintain Complete Statewide Sidewalk Data

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Washington State Department of Transportation Technical Monitor
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Prepared for
The State of Washington
Department of Transportation
Julie Meredith, Secretary

April 2026

TECHNICAL REPORT STANDARD TITLE PAGE

1. REPORT NO. WA-RD 957.1		2. GOVERNMENT ACCESSION NO.		3. RECIPIENT'S CATALOG NO.	
4. TITLE AND SUBTITLE Identification of the Optimal Approach to Maintain Complete Statewide Sidewalk Data				5. REPORT DATE February 2026	
				6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) Anat Caspi, Kunal Mehta, Tanisha Sepulveda				8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Washington State Transportation Center University of Washington, Box 359446 University Tower, 4333 Brooklyn Ave NE Seattle, Washington 98195-9446				10. WORK UNIT NO.	
				11. CONTRACT OR GRANT NO. Agreement T1461, Task AT	
12. SPONSORING AGENCY NAME AND ADDRESS Washington State Department of Transportation Transportation Building, MS 47372 Olympia, Washington 98504-7372 14 David Strich, Project Coordinator, David.Strich@wsdot.wa.gov				13. TYPE OF REPORT AND PERIOD COVERED Research Report	
				14. SPONSORING AGENCY CODE	
15. SUPPLEMENTARY NOTES This study was conducted in cooperation with the University of Washington.					
16. ABSTRACT Abstract This report synthesizes insights from eighteen WSDOT staff interviews to identify the roles, workflows, and steps needed to maintain a complete, reliable statewide sidewalk dataset that supports daily project delivery. Interviews pointed to recurring breakdowns in governance, approval, and update processes, especially closeout updates, provenance documentation, and unclear data ownership, alongside practical constraints in collection, validation, and integration. The outcome of the project is a recommendation for a pilot implementation providing the path forward for high-quality, up-to-date sidewalk data usable by all WSDOT staff and the public. WSDOT would benefit from this new data primarily through three new opportunities available: 1) improve project planning and engineering, 2) prioritize active transportation projects, and 3) support ADA coordination and transition planning.					
17. KEY WORDS Sidewalk, data				18. DISTRIBUTION STATEMENT	
19. SECURITY CLASSIF. (of this report) None		20. SECURITY CLASSIF. (of this page) None		21. NO. OF PAGES	
				22. PRICE	

DISCLAIMER

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Revision	Review Date	Reviewer Name	Drafter Name(s)	Comments / Change Summary	Action Taken	Approved (Y/N)	Approval Date	Version Released
	2025-08-14		Kunal Mehta, Anat Caspi	Initial draft.	Integrating Workflows 3 and 4	pending	pending	0.1
	2025-09-29		Anat Caspi, Tanisha Sepulveda	Draft post discussion	Rescoped outline per WSDOT recommendations.			
	2026-01-07		Kunal Mehta, Anat Caspi	redraft				
	2026-02-04		Kunal Mehta, Anat Caspi	Final draft				

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Executive Summary: Identification of the Optimal Approach to Maintain Complete Statewide Sidewalk Data

This report synthesizes insights from eighteen WSDOT staff interviews to identify the roles, workflows, and steps needed to maintain a complete, reliable statewide sidewalk dataset that supports daily project delivery. Interviews pointed to recurring breakdowns in governance, approval, and update processes, especially closeout updates, provenance documentation, and unclear data ownership, alongside practical constraints in collection, validation, and integration.

Overview of the Three Opportunities Identified Through the Project and the Pilot Workflow to Address WSDOT's Needs

The outcome of the project is a recommendation for a pilot implementation providing the path forward for high-quality, up-to-date sidewalk data usable by all WSDOT staff and the public. WSDOT would benefit from this new data primarily through three new opportunities available:

Opportunity 1: Improve Project Planning and Engineering

Clear information on status of pedestrian facilities would be available to project managers and engineers before, during, and after construction projects, enabling more efficient and coordinated planning and community engagement.

Opportunity 2: Prioritize Active Transportation in Projects

In the context of newly developed accessibility analysis processes vetted by the Multimodal Planning Division, WSDOT would be able to calculate the potential access gained from different projects and compare those benefits on a cost basis to improve visibility of non-drivers in project prioritization.

Opportunity 3: Support ADA Coordination and Transition Planning

ADA transition planning could pull directly from sidewalk datasets. Instead of static paper records, ADA coordinators would have a database of all pedestrian facilities available to perform system-wide compliance analyses.

Suggested Pilot Recommendation

A recommended pilot establishes clear governance and accountability, resolving the role of ambiguity that has historically delayed accurate updates. The pilot also commits the program to an auditable metric set with defined formulas, reporting cadence, and data sources. Finally, the pilot equips teams with standardized checklists and templates that align submissions, validation gates, provenance fields, risk tracking, and ADA documentation across projects. Together, these elements create a repeatable, auditable pathway from project intent to authoritative publication, making sidewalk data more trusted, current, and usable for planning, design, ADA coordination, and public transparency.

Project Scope and Background

Scope. This document is limited to the WSDOT study on the optimal way to integrate sidewalks data into operational use within WSDOT. Results describe practices and needs reported by WSDOT staff and do

not generalize to external agencies. Where helpful, we apply a lifecycle lens purely as an interpretive aid; the report's focus remains WSDOT's current operational context and feasible process adjustments.

Background. Scope of work for this study established the motivation for integration into WSDOT workflows of a statewide sidewalk dataset that is current, reliable, and usable across planning, engineering, construction, ADA coordination, and capital delivery workflows. Interview findings highlight constraints in data collection, manual integration burdens, and inconsistent documentation of approvals and updates.

Sidewalks Data, Why Now?

For decades, pedestrian access and accessibility have been managed through siloed, reactive workflows within transportation agencies. In this report, access refers to the ability of pedestrians to navigate the transportation system with the infrastructure available, while accessibility denotes the ADA compliance of the physical components of that system. Historically, data describing these elements has been collected inconsistently, often only in the context of specific capital projects, compliance reviews, or responses to public grievances rather than through systematic, proactive network management. While WSDOT maintains strong, well-established processes for roadway asset management, equivalent systems for pedestrian right-of-way data remain underdeveloped.

As a result:

- ❖ Project prioritization often relies on incomplete or inconsistent data about pedestrian networks.
- ❖ Project planning and engineering may discover accessibility barriers late in the design process, leading to costly retrofits or unaddressed gaps.
- ❖ ADA Transition Planning remains fragmented across jurisdictions and difficult to manage efficiently.

These challenges do not reflect a lack of commitment from WSDOT staff; rather, they stem from the absence of an integrated workflow that ensures consistent, lifecycle-based updating and sharing of pedestrian infrastructure data across the agency.

A Pivotal Moment

Several converging factors make this an opportune time to address pedestrian data integration at WSDOT:

Legislative investment in data modernization. The legislature has committed four years and \$10 million to statewide sidewalk data development. OS-CONNECT, delivered through the Transportation Data Exchange Infrastructure (TDEI), establishes an interoperable, scalable foundation for integrating pedestrian data into WSDOT workflows.

Regulatory pressure. ADA requirements remain firmly binding, and reactive compliance models expose agencies to legal and financial risks.

Through legislative directives such as Complete Streets, Active Transportation, and the HEAL Act, WSDOT has prioritized improvements in mobility and reductions in transportation harms for

underserved communities. Accurate pedestrian network data is essential to meeting these commitments.

Operational efficiency. Under fiscal constraints, WSDOT must minimize duplication and improve internal coordination. A coherent approach to sidewalk data management reduces redundant work and supports more efficient project delivery.

Project Purpose

OS-CONNECT, developed by the Taskar Center for Accessible Technology (TCAT) at the University of Washington, is a statewide data collection that standardizes, verifies, and shares high-resolution pedestrian infrastructure data—including sidewalks, curb ramps, crossings, and associated attributes. Built on open data standards and geospatial data models, OS-CONNECT is compatible with WSDOT’s existing GIS systems, asset management environments, and planning tools. It supports both human-readable and machine-readable formats, enabling integration with automated design systems (e.g., OpenRoads Designer, MicroStation), ADA compliance audits, and public-facing accessibility applications.

The purpose of this project is to integrate OS-CONNECT pedestrian data into WSDOT’s operational workflows to advance accessibility, equity, and efficiency in transportation planning and delivery. Embedding high-resolution pedestrian data into lifecycle-based project workflows enables WSDOT to shift from reactive compliance to proactive design, maintenance, and stewardship.

By contributing authoritative, up-to-date information to OS-CONNECT, WSDOT also ensures that other governmental entities—and the public—have access to consistent, credible data describing the infrastructure the agency builds and maintains. The long-term success of the legislature’s investment depends on ongoing stewardship and participation by roadway managers statewide.

Problem Context and Prior Work

Decades after the ADA’s passage, many municipalities still lack systematic approaches to pedestrian accessibility in the public right-of-way. Title II of the ADA mandates that public agencies identify and address physical barriers through ADA Transition Plans, yet compliance remains inconsistent. A 2021 regional study found that only 11% of surveyed municipalities had such plans on file, and none met all federal requirements [Metropolitan Planning Council & Great Lakes ADA Center, 2021]. Accessibility interventions are often tied to capital projects or driven by community grievances, leading to piecemeal progress.

The broader field of transportation planning increasingly emphasizes performance metrics related to sustainability, public health, and equity. However, accessibility metrics for pedestrian infrastructure remain inconsistently applied [Jackson, 2019]. Many practitioners lack reliable data on sidewalk and curb ramp conditions, as well as systematic engagement with people using the public right of way (PROW) [Levine & Karner, 2023]. This gap hinders both strategic planning and day-to-day decisions about barrier removal and investment prioritization.

Prior research has introduced numerous tools and frameworks to address these challenges. The Sidewalk Assessment Process (SWAP), developed by Axelson et al., provided an early systematic method for evaluating sidewalk accessibility [Axelson et al., 1999]. Matthews et al. built on this with a GIS-based approach that graded infrastructure based on impedance to mobility [Matthews et al., 2003]. Subsequent work has proposed scoring systems, such as Halabya and El-Rayes' Non-Compliance Index (NCI), to prioritize upgrades based on severity, cost, and location importance [Halabya & El-Rayes, 2017; Halabya & El-Rayes, 2020]. Despite these innovations, adoption within public agencies has been limited.

Network-level analyses have further highlighted the disparities in access. Tools like those developed by Bolten and Caspi compare normative walking reach with constrained routes available to mobility-impaired users [Bolten & Caspi, 2021]. These methods underscore the systemic nature of inaccessibility and provide compelling evidence for data-driven prioritization.

We situate these findings within broader theoretical work on infrastructural justice [Fladvad, 2023] an emerging framework that draws attention to how material systems (like sidewalks, signals, and crosswalks) reflect and reproduce social inequities. From this perspective, the exclusion of disabled pedestrians is not only a product of physical barriers in the built environment, but also of the professional routines, data silos, and institutional priorities that structure planning itself. Supporting upstream integration of accessibility thus requires more than better datasets: it demands collaboration with those who govern the data, and greater inclusion of disability expertise in the values and tooling that shape infrastructure design and investment.

Opportunities for Impact

Addressing pedestrian infrastructure data workflows at WSDOT creates immediate opportunities to:

- ❖ **Prioritize active transportation more effectively.** Robust pedestrian data enables development of improved metrics for network performance and supports identification of high-impact investments that increase access and reach for non-drivers.
- ❖ **Improve project planning and engineering.** Embedding pedestrian data updates into existing project workflows ensures project teams have accurate baseline conditions, supports better alternatives analysis, and reduces late-stage ADA-related revisions.
- ❖ **Strengthen ADA coordination and transition planning.** A unified and consistent approach to data management enables ADA managers to coordinate seamlessly with engineering, planning, and regional teams, moving from complaint-driven to standardized, lifecycle-based processes.

Collaborative, Multidivisional Pilot

This project does not prescribe sweeping change. Instead, it proposes piloting minor but important changes in the workflows of multiple WSDOT divisions as a Pilot Workflow Study. The pilot will focus on pedestrian infrastructure data collection and storage processes and be integrated with current standard practices. The outcomes of the pilot will be new capacities for project prioritization, planning and engineering operations, and ADA coordination. Work and outcomes will be shared across the engaged divisions, so that project participants all contribute and see value from their engagement.

1. Methods

The study design emerged from a series of collaborative discussions between the UW Taskar Center for Accessible Technology (TCAT) research team and WSDOT partners (consider specific examples? i.e.: Public Transportation Division staff, etc.). These conversations established that a semi-structured interview approach would be the most suitable method for capturing the diverse, cross-functional practices associated with sidewalk and pedestrian infrastructure data across the agency. The format was intentionally chosen to balance depth—allowing detailed exploration of workflows, data practices, and constraints—with flexibility, enabling participants to share perspectives and insights that extended beyond the predefined protocol.

To encourage richer dialogue and surface inter-role dependencies, interviewees with complementary responsibilities were paired. For example, a WSDOT staff member responsible for ADA compliance at the statewide level was paired with a regional ADA coordinator. These pairings helped illuminate variations in practice across organizational layers and highlighted points where coordination challenges emerge.

All interviews were conducted virtually and recorded with participant consent for the purposes of analysis. No personally identifiable information is reported; all findings use pseudonyms such as P1, P2, and P3 to maintain confidentiality.

Interview Protocol

The interview protocol was developed jointly by TCAT researchers and WSDOT project partners. It is focused on how sidewalk data is collected, evaluated, integrated, and used in operational decision-making. Core topics included:

- participants' professional backgrounds and day-to-day responsibilities;
- desired sidewalk and curb-ramp attributes for planning, engineering, and ADA workflows;
- data quality expectations and verification practices;
- challenges in merging or reconciling datasets across systems;
- ADA compliance processes, including documentation and MEF use;
- inventory management approaches and resource constraints.

When time permitted, participants also provided feedback on a prototype version of the Walkshed analysis tool developed by TCAT. The protocol included approximate time allocations for each topic and is provided in full in Appendix A.

Minor, iterative refinements were made to the protocol as the study progressed to ensure questions remained relevant to the roles and contexts of interviewees.

Interview Facilitation

Interview invitations were distributed at least one week prior to each session and included a description of the study's purpose and scope. Each interview was facilitated by two members of the TCAT research

team, with an observer from the WSDOT project team present. One facilitator led the conversation; the second ensured adherence to the protocol, managed note-taking, and handled logistical aspects of the session.

The facilitation approach emphasized participant comfort and openness. Anonymity was reiterated at the start of each interview, and explicit consent was obtained prior to recording. When clarifications were needed, follow-up communications were conducted.

A total of 10 interviews, involving 18 participants, were conducted. Each session lasted between 60 and 90 minutes.

Interview Analysis

Interview Debriefs

Following each interview, facilitators conducted a structured debrief to capture preliminary observations and ensure that notable details were documented. These debriefs supported real-time reflection and enabled minor procedural adjustments to improve clarity and consistency across subsequent sessions. In addition, the TCAT team met with WSDOT partners after every several interviews to validate emerging impressions and ensure alignment with project goals.

Detailed Analysis

The formal analysis of interview data followed a multi-step, collaborative process:

- ❖ Each facilitator reviewed interview recordings and notes, producing detailed summaries.
- ❖ The team collectively developed an initial codebook by grouping recurring observations into preliminary topical categories.
- ❖ Facilitators independently coded the interview material using the draft codebook and identified themes across participants.
- ❖ Cross-review was conducted to reconcile thematic interpretations and reduce potential bias.
- ❖ A preliminary findings report was prepared and shared with WSDOT partners for validation.
- ❖ Using the validated findings, the team developed user stories reflecting common operational needs.
- ❖ In collaboration with WSDOT partners, the team identified key opportunities for improving sidewalk-related data workflows.

Thematic Analysis

Approach. We used a codebook-driven, iterative thematic analysis (refs?). First, the team performed an open coding pass on all interview notes and recordings to capture discrete evidence statements (e.g., “crash and sidewalk data are not well aligned,” “inventory is presence/absence-only,” “MEF justifications are sometimes overused”). Each statement was documented with a source tag (interview number) and a short, descriptive code. Next, we converged codes into axial categories that describe recurring issues at the system level (e.g., Integration misalignment, Inventory constraints, Reactive ADA, Data quality & provenance, Jurisdictional/ownership gaps). Finally, we linked themes to lifecycle phases

(Collect → Process/Update → Validate → Govern/Publish) to ensure findings could be actioned in operations, not just reported descriptively.

Evidence handling and reliability. For every theme, we required multiple, independent statements across interviews (or one statement corroborated by two or more distinct, related observations) to avoid overweighting single perspectives. Ambiguous or role-specific claims were retained as sub-codes but not promoted to top-level themes unless they appeared across at least two interviews or materially affected statewide workflows. Conflicting accounts were explicitly noted and treated as contingent conditions (e.g., “tool capacity varies by region/agency”).

From statements to themes. Granular evidence was aggregated into the final themes

Traceability matrix. To make the derivation auditable, we maintained a theme to code to evidence map.

Theme stability and data saturation. We considered a theme stable when (a) its codes appeared in at least two interviews and (b) codes were internally consistent (i.e., not contradicted by repeated counter-evidence). After 5 interviews, no new top-level themes emerged; remaining additions refined sub-codes (e.g., specific attributes desired for inventory, or particular integration pain points with LRS vs. XY data). This indicated practical saturation for the scope of this sub-study.

Outcome of analysis. The resulting theme set underpins the Frequently Raised Themes table and the Detailed Findings sections. Please see [Table 2](#). It also informed the crosswalk to lifecycle phases and the selection of pilot interventions targeting (1) early scoping checks, (2) structured design/closeout updates, and (3) metadata/provenance requirements, each directly traceable to the coded evidence above.

2. Collected Data and Analysis

Interviews

The research team conducted semi-structured interviews with 18 WSDOT staff across 10 sessions, pairing complementary roles (e.g., ADA coordination with regional design) to elicit cross-functional practices. Interviews were recorded with consent, anonymized, and analyzed through a codebook-driven thematic approach. Two facilitators independently coded transcripts and reconciled themes to reduce bias; findings were reviewed with WSDOT partners.

Table 1: Interviewee Roles and Functions

ID	Role Category	Key Functions Relevant to Sidewalk/ADA Work
P1	GIS systems & metadata	GIS admin; supports consistency
P2	Complete Streets / Pre-design	Scoping, GIS analysis; indirect ADA role
P3	Active transportation (AT) & safety	Crash analysis, signage, ADA-related review
P4	AT Program Supervisor	Non-motorized design, ADA-related guidance
P5	Contracts / Planning	Coordinates AT projects; ADA-aware
P6	Complete Streets Coordinator	Conducts ADA & pedestrian reviews
P7	GIS support	Data mining/visualization; not ADA-focused
P8	Statewide policy	Leads Complete Streets implementation
P9	Complete Streets Planner	Screens projects for accessibility
P10	Safety & asset management	Leads VRU analysis; ADA inventory maintenance
P11	AT Planner	Pre-design mapping; infrastructure analysis
P12	AT SME	Equity/health/safety analyses; ADA-relevant
P13	ADA Coordinator	Leads ADA compliance & inventory verification
P14	ADA design specialist	Detailed ADA engineering review & MEF guidance
P15	ADA Assistant Director	Oversees statewide ADA compliance & grievances
P16	Asset Manager	ADA design SME; manages regional liaisons
P17	AT Programs Manager	Oversees AT funding & project evaluation
P18	Planning portal manager	Data integration; growing accessibility analytics

The heatmap [Figure 1](#) below identifies how the interviewees aligned with, and to what extent, the data life cycle roles associated with maintaining and updating sidewalks data. Data life cycle roles were summarized in the following roles:

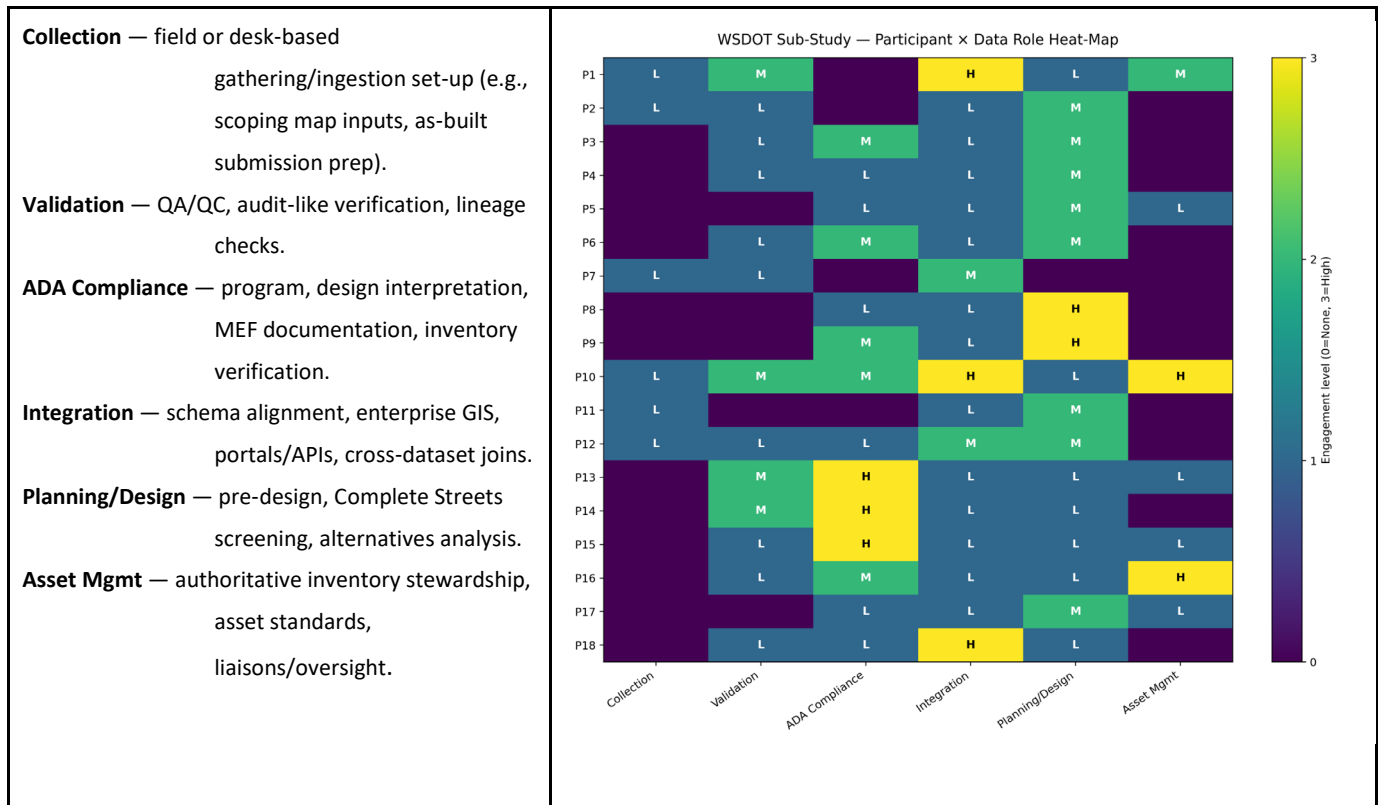


Figure 1: Heat-Map— Participant × Data Role

Theme Development

The following sections illustrate groupings/categories/subthemes that emerged and evidence to support the themes

Theme: Use of MEF (Maximum Extent Feasible)

Repeated concerns about **frequency, documentation, and oversight** of MEFs—paired with mentions of dataset flags and regional pattern checks—indicate a theme centered on **MEF governance and traceability**, not just isolated design exceptions.

Examples include:

- “MEF justifications are sometimes overused” (Int. 7);
- “ADA exception documentation lacks a centralized tracking system” (Int. 7);
- “ADA-specific flags (e.g., MEF justifications) are used in datasets to explain noncompliance” (Int. 5, Int. 7);

- “Staff are guided through MEF decisions... excessive use is discouraged to maintain legal defensibility; trends in MEF justifications are reviewed to detect overuse” (Int. 7).

Theme: Presence/Absence-Only Sidewalk Data

Multiple interviews describe **resource-constrained inventories** that capture presence/absence but not design-grade attributes, reinforcing a theme of **limited attribute depth** and **non-comprehensive coverage**.

Examples include:

- “Limited staff capacity restricts data collection to presence/absence information” (Int. 5);
- “Inventory mostly captures presence due to resource constraints” (Int. 5);
- “Sidewalk data is only collected along state routes and is incomplete” (Int. 1, Int. 2);
- “No statewide pedestrian inventory exists; sidewalk data is fragmented” (Int. 3, Int. 4).

Theme: Use of Aerial Imagery for Verification

The reliance on **imagery-based spot checks**—and the need for **post-hoc corrections**—signals a theme of **manual, image-dependent verification** that is necessary but limited for operational QA/QC.

Examples include:

- “Infrastructure validation relies on manual review using Google Maps and aerial imagery” (Int. 9);
- “Accuracy is difficult to verify; aerial imagery is one tool, but alignment with internal data is preferred” (Int. 1);
- “Post-construction updates and aerial overlays are often required to correct geospatial placement” (Int. 8).

Theme: Manual Data Collection or Post-Processing Burden

Convergent evidence across formats (Excel/PDF), pipelines (manual SQL), and technologies (StreetLight, LiDAR) indicates a theme of **labor-intensive workflows** that impede timeliness and scalability.

Examples include:

- “Data collection is often done in Excel or on paper” (Int. 3);
- “Third-party tools like StreetLight require significant post-processing” (Int. 6);
- “Asset edits are manually staged and uploaded to SQL” (Int. 8);
- “Manual digitization in ArcPro uploads data to a SQL backend” (Int. 8);
- “Mobile LiDAR is promising but costly and requires intensive processing” (Int. 5; see also Int. 8).

Theme: Project-Triggered ADA Improvements

Cross-role statements depict ADA work as **event-driven** (project or grievance), rather than **programmatically scheduled**, underscoring a **reactive compliance posture**.

Examples include:

- “ADA updates can be reactive and triggered by projects” (Int. 4);
- “ADA improvements often occur only during roadway upgrades or capital projects” (Int. 3, Int. 5);
- “ADA work is often reactive, prompted by grievances or complaints” (Int. 2, Int. 7).

Theme: Siloed or Fragmented Systems

Recurrent references to **parallel systems** without a unifying layer reveal a theme of **organizational fragmentation** that complicates sharing, governance, and update routines.

Examples include:

- “Sidewalk data is maintained in siloed datasets by different groups” (Int. 1, Int. 3);
- “Multiple systems like HATS and SIMS are siloed and not interoperable” (Int. 8);
- “No centralized statewide asset management system exists” (Int. 8).

Theme: Coordinate System / Spatial Alignment Issues

Recurrent references to legacy systems, inconsistent coordinate systems, and a lack of unified referencing reveal a theme of spatial misalignment that complicates integration and quality assurance. Persistent referencing and projection drift—LRS vs. XY, and directional mileposting—further reinforce this issue. This constitutes a clear spatial alignment theme affecting integration and QA.

Examples include:

- “Legacy systems and inconsistent coordinate systems increase complexity” (Int. 2);
- “Merging datasets is difficult due to coordinate misalignments; standardizing projections is necessary” (Int. 3);
- “Annual updates to LRS cause misalignments with sidewalk data; XY coordinates messy without LRS calibration; directional differences in mileposting” (Int. 1, Int. 5);
- “Lack of a unified referencing system across sidewalks and roads” (Int. 4).

Theme: Need for Buffer / Splash Zone or Exposure Data

Recurrent references to buffers, splash zones, and contextual exposure factors reveal a theme focused on quantifying pedestrian proximity to and interaction with vehicle traffic. This reflects a need for attributes that capture pedestrian exposure and inform design and prioritization decisions.

Examples include:

- “Presence and width of buffers between sidewalk and roadway (grass, bike lanes, barriers)” (Int. 2, Int. 4, Int. 6);
- “Buffer type and pedestrian stress factors (speed, lane count, volume)” (Int. 4);
- “Splash zone consideration—how close pedestrians are to travel lanes” (Int. 6);
- “Curb radius and crossing width to assess pedestrian exposure” (Int. 4).

Theme: Desire for LiDAR or Advanced Survey Tools

Recurrent references to mobile LiDAR and advanced sensing tools reveal a theme centered on the potential for higher-accuracy data collection alongside challenges of cost, processing demands, and operational feasibility. This theme centers around tooling potential vs. operational feasibility.

Examples include:

- “Mobile LiDAR is promising but costly and requires intensive processing” (Int. 5);

- “Mobile LiDAR produces large datasets that are difficult to process; field staff need more tools for accurate inventories” (Int. 8).

Theme: Lack of Screen Reader / Accessibility in Tools

Consistent feedback on limited web accessibility, lack of screen reader compatibility, and gaps in keyboard navigation and UI design points to a broader theme of inadequate accessibility or ADA compliance in planning tools and public-facing maps.

Examples include:

- “Web accessibility in planning tools is limited; many GIS systems are not screen reader compatible” (Int. 10);
- “Public-facing maps lack accessibility for different populations” (Int. 10);
- “Improvements needed in keyboard navigation and UI design for planning tools” (Int. 10).

Theme: Data Merging / Integration Challenges

Misalignment between crash and sidewalk data, reliance on separate and uncoordinated sources, project-specific and localized integration practices, manual merging across siloed systems, and the absence of consolidated layers point to a broader theme of systemic data merging and integration challenges. In sum, integration is ad hoc, localized, and tool-dependent, substantiating systemic merging barriers and missing composite layers.

Examples include:

- “Crash and sidewalk data are not well aligned; pedestrian layers hard to correlate” (Int. 2);
- “Active transportation projects rely on separate, uncoordinated data sources” (Int. 4);
- “Data integration is project-specific; handled locally due to limited state ownership” (Int. 6);
- “Systems are siloed; merging across them requires manual processes” (Int. 8);
- “No consolidated layer for crossings/islands/roundabouts; statewide merging/equity analysis unsupported” (Int. 9).

Theme: PDF / Paper Submissions from Jurisdictions

This theme reflects inconsistent, non-standard data handoffs, shaped by heterogeneous submission formats such as Excel, paper, and PDFs, varying levels of detail across jurisdictions, and limited field verification.

Examples include:

- “Data collection is often done in Excel or on paper” (Int. 3);
- “Some subrecipients submit detailed GIS inventories; others submit minimal or paper-based reports (PDFs)” (Int. 7);
- “Data is often not field-verified and relies on jurisdiction submissions” (Int. 1).

Theme: Desire for Ownership / Maintenance Responsibility Data

This theme reflects the need for clear ownership and maintenance responsibility data, as confusion around jurisdiction and ownership reduces clarity in accountability for upgrades and data stewardship.

Examples include:

- “Jurisdiction and ownership: who owns and maintains the sidewalk” (Int. 2, Int. 3);
- “Sidewalk ownership confusion limits responsibility clarity for upgrades” (Int. 3);
- “Data ownership is key—knowing who maintains sidewalk data helps clarify responsibility” (Int. 3).

Theme: Lack of GIS Capacity in Local Agencies

This theme speaks about limited GIS capacity in local agencies, as constraints in digital literacy, funding, staffing, and access to tools hinder data maintenance and effective use.

Examples include:

- “Limited digital literacy and GIS capacity among smaller jurisdictions; jurisdictions lack funding to update data” (Int. 3);
- “Smaller agencies lack tools or staff to maintain inventories” (Int. 1);
- “ArcGIS tools are inaccessible to small agencies due to cost/training; users struggle with portals” (Int. 10).

Theme: Use of Sidewalk Data for Equity / Safety Planning

Participants connect data completeness and mergeability directly to equity and safety analyses, supporting the idea of prioritizing data-driven, distributional, and risk-based planning.

Examples include:

- “Equity analysis is limited by sidewalk and crossing data gaps” (Int. 9);
- “Accurate data is critical for safety-related analysis; pedestrian crash data underrepresented” (Int. 5, Int. 2);
- “Merges with safety, equity, and accessibility indicators for performance dashboards” (Int. 10);
- “Traffic data integration (speeds/volumes/freight) is needed” (Int. 2, Int. 6).

Frequently Raised Themes

The table below summarizes the most frequently cited themes across interviews. Counts indicate the number of interviews in which a theme appeared (not total mentions). Quotes are representative, not exhaustive.

Table 2: Frequently Raised Themes

Aspect / Theme	# of Interviews Mentioned (Repeat Count)	Explanation	Related Quotes
Use of MEF (Maximum Extent Feasible)	6	Use of ADA design exceptions when full compliance isn't feasible.	"We're not supposed to MEF everything... if it gets too high, then is it really occasional or rare?" (7)
Presence/Absence-Only Sidewalk Data	7	Datasets only record whether a sidewalk exists, without assessing quality, width, or condition.	"We can only collect presence/absence data for now. That's all we can manage with current staff." (5)
Use of Google Maps / Aerial Imagery for Verification	6	Staff use tools like Street View or orthoimagery to manually verify sidewalk presence.	"I have to use Google Maps and Street View to check if there's actually a sidewalk there." (9)
Manual Data Collection or Post-Processing Burden	8	Infrastructure data is still gathered or cleaned manually due to a lack of automation.	"Collecting LiDAR is the easy part. It's compressing and extracting the data that kills us." (8)
Project-Triggered ADA Improvements	6	ADA updates typically occur only when a larger project (e.g., paving) is planned.	"Alterations, like paving, are what really drive ADA work—not standalone plans." (8)
Siloed or Fragmented Systems	7	Agencies and teams use disconnected software systems that don't coordinate well.	"We don't have a global asset management system. We have many components... maintenance has HATS, traffic has SIMS." (8)
Coordinate System / Spatial Alignment Issues	5	Datasets are difficult to integrate due to mismatched spatial references or formats.	"Northbound and southbound have different mileposts. We can't link ramps to crash data that way." (5)
Need for Buffer / Splash Zone or Exposure Data	3	Lack of attributes to capture pedestrian exposure or discomfort near vehicle traffic.	"You had a 10–12 foot green strip before. Now the sidewalk is right up against the curb. That's a splash zone problem." (6)
Desire for LiDAR or Advanced Survey Tools	6	Stakeholders want to use LiDAR to collect precise sidewalk and ADA data at scale.	"Mobile LiDAR is huge for us... but the processing part is still very manual and time-consuming." (8)
Lack of Screen Reader / Accessibility in Tools	3	Planning tools are not designed with accessibility features for users with disabilities.	"Our planning portal isn't fully screen-reader compatible. That's a barrier." (10)
Data Merging / Integration Challenges	7	Difficulty combining sidewalk data with related data (e.g., crash, demographic, transit).	"We had to manually overlay census tracts and sidewalk gaps—it took days." (6)
PDF / Paper Submissions from Jurisdictions	4	Local jurisdictions often submit sidewalk data as PDFs or hand-marked maps, not GIS files.	"Some agencies send PDFs with lines drawn on maps—no GIS data at all." (3)

Aspect / Theme	# of Interviews Mentioned (Repeat Count)	Explanation	Related Quotes
Desire for Ownership / Maintenance Responsibility Data	5	Need for clarity on which entity is responsible for sidewalk upkeep.	"Sometimes the sidewalk that belongs to WashDOT might only be like a 600-foot section... surrounded by city-owned sidewalk." (7)
Lack of GIS Capacity in Local Agencies	6	Many local agencies lack GIS licenses, staff, or skills to manage digital infrastructure data.	"A lot of small jurisdictions don't even have GIS. They rely on consultants or do nothing." (3)
Use of Sidewalk Data for Equity / Safety Planning	5	Sidewalk data is being used to evaluate access gaps, crash risk, and community equity.	"We use sidewalk and trip generator data to assess health equity impacts under the HEAL Act." (6)

3. Detailed Findings

This section presents detailed findings from the interviews, organized across key areas including current workflows, data needs, quality considerations, integration challenges, ADA compliance, and inventory management. Together, these findings illustrate how fragmented practices, limited capacity, and inconsistent standards shape the current state of sidewalk data and highlight opportunities for more integrated, proactive, and accessible approaches.

Current Workflow and Gaps

Interviewees spoke about relying on self-reported data that is often not field verified. WSDOT Regional offices face staffing and tool limitations that hinder the maintenance of sidewalk inventories. Inconsistent data formats and spatial referencing practices make integration across systems challenging. Legacy systems and siloed data structures prevent alignment between crash data and sidewalk datasets. Many local jurisdictions lack GIS capacity (i.e. staff, technology, funding, etc.), resulting in data being maintained in Excel files or on paper. ADA infrastructure conditions are not monitored systematically, and updates to infrastructure are often triggered by specific projects rather than conducted proactively. Limited staff and resources restrict data collection efforts to basic presence or absence metrics. While mobile LiDAR is viewed as a promising approach, it is expensive and requires intensive processing. Tools currently in use, such as StreetLight, often require extensive post processing and do not integrate well with planning workflows. ADA justifications, including maintenance and exception forms, are inconsistently documented and overused in some cases. Asset edits are manually staged, and a statewide asset management system does not exist. Infrastructure validation relies heavily on aerial imagery and manual processes. Planning tools are often inaccessible to smaller agencies and to screen reader users.

Desired Sidewalk Data Attributes

Participants expressed a need for data on the presence of pedestrian signals, crosswalk types, and safety features such as curb extensions. Historical infrastructure data and information on update frequency were considered important. There was a strong desire for intersection level detail, including cross streets, county roads, and jurisdictional information. Integration with state highway data, along with documentation on data quality and collection methodology, was viewed as critical. Detailed crossing information such as lighting, signage, and traffic speed or volume was frequently mentioned. Participants also highlighted the importance of capturing obstructions including poles, mailboxes, vegetation, and sidewalk damage. Sidewalk condition data covering cracks, slopes, tree root damage, and compliance status was emphasized. Buffer presence and type, pedestrian exposure, and splash zone effects were also identified as relevant attributes. ADA ramp locations, compliance status, landing areas, and connectivity across curb ramps and crosswalks were seen as essential. Walkability factors such as width, incline, directional slope, surface materials, and precision indicators at the segment level were requested. Integration with transit, including bus stop accessibility and transfer quality, was highlighted. Pedestrian comfort and context factors such as land use, visibility, and street activity were considered valuable, along with average daily pedestrian, bicycle, and vehicle volumes. Participants also noted the importance of attributes that reflect why someone might be present in a given area.

Data Quality Aspects

Participants reported having geospatial and metadata standards but noted ongoing challenges with consistent application. Data completeness, accuracy, and update frequency were identified as major concerns. Satellite imagery is commonly used for verification, although participants acknowledged its limitations. Pedestrian safety data is underreported and difficult to correlate with infrastructure datasets. Clear data ownership was seen as an important factor in assessing trustworthiness. Inconsistent counting methods, such as differences between bus and rail passenger counts, complicate data use and interpretation. Data for shared use paths and rural sidewalks is often incomplete or outdated. Participants expressed a strong preference for well documented and transparent datasets. Field collected data was generally trusted, although complex environments were acknowledged to remain prone to errors. Metadata was expected to include information on data source, collection date, and a point of contact. Simpler datasets with strong documentation were often viewed as more valuable than complex datasets lacking sufficient context.

Data Merging and Integration Challenges

Sidewalk data is not topologically aligned with roadway datasets, creating significant integration challenges. Manual and siloed systems, such as HATS and SIMS, prevent seamless data merging. Participants cited frequent issues related to different coordinate systems, inconsistent attribute definitions, and XY misalignments. Bus stop and crash data are often not mapped in relation to sidewalks. Data merging is typically handled on a project specific basis and managed at the local level. Tools such as ArcGIS and Excel are commonly used, but successful integration depends heavily on underlying data quality. Rural data was described as particularly sparse, and access to existing datasets is sometimes limited by permissions. Participants emphasized that integration efforts should support safety, equity, and accessibility indicators. Recommendations included the use of centralized GIS tools, web services, shared repositories, standard coordinate systems, and improved metadata practices. Integration was also expected to include trip generators such as schools and parks and to support automated investment scoring.

ADA Compliance

Responsibility for ADA compliance is distributed across planning, engineering, and capital delivery teams. Compliance activities are often triggered by projects rather than incorporated into routine assessments. Data used for ADA compliance is tracked manually and lacks consistency at the statewide level. Maintenance and exception form justifications are applied inconsistently and are often undocumented. Engineers are trained to apply design flexibility, with curb ramp placement and alignment identified as key areas of concern. Participants noted that lighting, drainage, snow clearance, and surface quality significantly impact usability. ADA compliance was described as needing to consider corridor wide connectivity across sidewalks, landings, and crossings. Tools such as RDI and pedestrian stress indicators are used to support compliance evaluation. Barrier removal prioritization is guided by access to services and safety risk. WSDOT is described as moving toward a more proactive ADA culture, with updates to Public Rights-of-Way Access Guidelines (PROWAG) already being adopted. Accessibility barriers within planning tools remain a challenge, particularly for screen reader users.

Inventory Management

Participants reported that no centralized, statewide sidewalk inventory system currently exists. Sidewalk data is collected inconsistently and maintained in siloed formats. Data collection is typically triggered by specific projects rather than ongoing programs. Inventories rely heavily on field surveys, spreadsheets, and tools such as Google Earth. Due to limited staffing, data collection efforts prioritize basic presence information. Inventories commonly include curb ramps, crosswalks, and features flagged through maintenance and exception forms. Manual digitization and correction using aerial imagery are common practices. A SQL based backend supports internal GIS tools and public open data access. Participants emphasized the need for improved inventory guidance, stronger metadata stewardship, and standardized data formats. High quality inventories were described as including maps, detailed attributes, and documentation of responsible parties. A regular update cycle and stronger cross-agency coordination were strongly recommended.



Observed risks concentrate at governance/approval/update. Operational remedies drawn from interview evidence: early checks in scoping, structured CAD/as-built ingestion, and transparent metadata/provenance.

Figure 2. Lifecycle Stewardship.

Four-stage data-lifecycle diagram showing Collect (design-grade + condition), Process & Update (integrate + version), Validate (audit-like QA + lineage), and Govern & Publish (ownership + closeout updates). Arrows indicate progression; the governance phase is highlighted to reflect where risks concentrate and where interventions—early scoping checks, structured CAD/as-built ingestion, and transparent metadata/provenance—are targeted.

4. Technical Overview and Pilot Opportunities

Following the identification of detailed findings through thematic analysis of interview data, the development of user stories represented a logical next step in translating insights into actionable system requirements. By re-examining the identified themes alongside the original interview transcripts, the project team was able to ground abstract findings in concrete operational needs, roles, and decision contexts. This process ensured that the perspectives and lived realities expressed by WSDOT stakeholders were accurately reflected, while also enabling the synthesis of recurring patterns across departments. Developing user stories at this stage supported a structured transition from analysis to design by framing needs in terms of goals, constraints, and workflows that could inform subsequent process interventions and system design decisions.

The user stories were presented to the WSDOT project team, after which a collaborative review process was used to identify key opportunities. An overview of each identified opportunity is presented below.

Opportunity 1: Improve Project Planning and Engineering

Pilot Workflows for Upstream Use of Pedestrian Data during Scoping and Design

Project scoping and engineering are decisive stages where design choices translate into built infrastructure. Currently, Complete Streets and accessibility considerations often enter late in this process, either during project compliance reviews or after construction, when corrections require costly retrofits. This results in inefficiencies, increased costs, and in some cases, infrastructure that technically complies with ADA or is aligned with Complete Streets values but fails to deliver meaningful usability.

This opportunity proposes pilot workflows to integrate OS-CONNECT pedestrian data at the earliest phases of project scoping and design. By embedding pedestrian network data into standard checklists and design tools, engineers and planners can proactively identify barriers and evaluate alternatives before designs are finalized.

Example: OS-CONNECT as a Pre-planning Input; CAD/As-Built Updates Feeding Datasets

Two points of intervention opportunities stood out in the interviews conducted with WSDOT planners:

(1) Pre-Planning Input: Before a project scope is finalized, engineers review OS-CONNECT data to identify gaps in sidewalks, crossings, and curb ramps within the project area. This allows accessibility considerations to be factored into alternatives analysis alongside roadway performance, safety, and cost. For example, a corridor resurfacing project might also integrate missing curb ramps if gaps are evident in OS-CONNECT data. **(2) As-Built Updates:** At project completion, verified as-built *walkthrough* with a digital data input technology, rather than files (CAD or BIM), are used to update OS-CONNECT. Rather than accessibility data ending in paper records or siloed forms, it becomes part of a living statewide dataset. This ensures that the next project in the corridor, whether pedestrian-focused or not, works with current, accurate baseline data.

Benefits: Reduced Retrofits, Fewer Late-Stage ADA Compliance Fixes

By moving accessibility upstream and ensuring continuous updates, WSDOT can expect several benefits:

1. **Reduced Retrofits:** Early integration of accessibility reduces the likelihood of costly late-stage corrections.
2. **Improved Complete Streets and ADA Compliance:** Systematic data integration supports more consistent compliance, minimizing risk of grievances or litigation.
3. **Operational Efficiency:** As-builts submitted in digitally structured formats (e.g., digital forms filled and directly accessing a draft data twin of OS-CONNECT) streamline updates, reducing duplication of effort between contractors, engineers, and data stewards.
4. **Better Multimodal Outcomes:** Ensuring pedestrian considerations are addressed in roadway projects supports broader goals around Complete Streets and multimodal equity.

Future Pilot Proposal: Integrating OS-CONNECT into Design Review Checklists in Two Regions

We recommend a future pilot of this workflow in two WSDOT regions where project pipelines are active and leadership is supportive of data innovation. The pilot would involve:

- Amending design review checklists to require review of OS-CONNECT pedestrian data during scoping.
- Training project engineers to interpret accessibility datasets and use them in alternatives analysis.
- Collecting as-built digital information in a standardized format, integrating it directly into OS-CONNECT and testing automated ingestion in OS-CONNECT after the fact.
- Evaluating outcomes: Did early integration reduce ADA compliance issues? Were as-built updates successfully incorporated into OS-CONNECT datasets? What was the workload impact on engineers?

This pilot would provide direct evidence of how data-informed scoping and systematic data maintenance can reduce inefficiencies and improve equity outcomes across project delivery.

Opportunity 2: Prioritize Active Transportation in Projects

Pilot Workflows That Integrate OS-CONNECT/OSW Data into Prioritization

Project prioritization frameworks at WSDOT have historically relied on roadway performance measures (e.g., safety, congestion relief, pavement condition). These frameworks rarely incorporate pedestrian access as a quantifiable dimension of system performance. This creates blind spots, especially in regions where walking and rolling represent essential modes of travel for residents without consistent access to vehicles.

This project introduces the opportunity for WSDOT to use OS-CONNECT, an initiative funded by the WA state legislature and OSW pedestrian datasets, a wider sidewalks network developed by the research team as part of prioritization scoring systems. These datasets provide standardized information on sidewalk networks, crossings, curb ramps, and barriers (attributes that are currently fragmented or absent in prioritization tools). Integrating this data enables a shift from qualitative judgments of accessibility to consistent, evidence-based scoring across regions.

Example: Using Walksheds and Access Scores in Grantmaking and Project Ranking

One technical pathway is the use of personalized walksheds, a graph-based access analyses that measure how far a person can travel under specified mobility constraints (e.g., wheelchair navigation, slope tolerance, absence of curb ramps). By comparing network access before and after proposed investments, planners can compute marginal access gains.

For example:

- A state-route crossing upgrade could be modeled to expand the walkshed for wheelchair users by 35%, providing access to transit stops and commercial areas previously unreachable.
- Sidewalk infill projects around schools could be shown to expand safe walking access by hundreds of households, quantifiable in terms of equity-weighted student populations.

These access scores can be incorporated into WSDOT's existing project ranking processes or grantmaking frameworks. Technically, they function as an additional performance measure—comparable in rigor to crash reduction factors or freight mobility indices.

Benefits: More Transparent, Equity-Aware, Consistent Decision-Making

Accessibility analysis scores could then be compared between projects, and when weighted for project cost, determine which projects provide the most benefit-per-dollar. The introduction of accessibility metrics offers several system-level benefits:

- **Transparency:** Scoring methodologies can be published alongside project lists, making clear how accessibility influenced prioritization decisions.
- **Equity Alignment:** Accessibility scores inherently highlight disparities in communities where missing pedestrian infrastructure suppresses mobility, aligning prioritization with statewide equity goals.
- **Standardization:** OS-CONNECT data provides a uniform reference, reducing regional variation in how accessibility is defined or weighted.
- **Risk Reduction:** Prioritizing accessibility earlier decreases reliance on retrofits, lowering long-term compliance and construction risks.

Opportunity 3: ADA Coordination and Transition Planning

Pilot Workflows for Using Pedestrian Datasets in ADA Compliance and Complete Streets Monitoring

ADA transition planning and the Complete Streets (WSDOT only) reviews are the formal mechanism through which public agencies identify, document, and address accessibility barriers in the public right-of-way. WSDOT planners indicated this work is often reactive and fragmented, relying on static reports and locally maintained spreadsheets. The interviews we conducted with WSDOT planners and ADA coordinators revealed that these practices limit both accountability and long-term coordination.

To address these gaps, this opportunity proposes pilot workflows that use OS-CONNECT pedestrian datasets as the backbone of ADA and Complete Streets compliance monitoring. Planners and engineers could work from a dynamic, GIS-based dataset that reflects both project improvements and ongoing

barriers instead of an inventory created in one moment in the past. This approach shifts ADA planning from a compliance “box-checking” exercise to a proactive, data-informed process embedded in everyday project delivery.

Example: Transition Plans Enhanced with Dynamic, GIS-Based OS-CONNECT Data

In interviews, participants consistently expressed frustration with transition plans that quickly became outdated. As one planner noted, “We might spend six months building a report, but by the time it’s published, half of it is obsolete because new projects have changed the field.”

A more effective model is a living transition plan linked directly to OS-CONNECT. In this approach:

Field-collected data, contractor submissions, and project as-builts automatically update the dataset.

GIS-based dashboards visualize current compliance levels, highlight barriers, and allow users to filter by region, facility type, or project status. ADA coordinators can track progress over time, share transparent metrics with the public, and more easily justify investment priorities. This dynamic system reduces the administrative burden of producing static documents while enhancing both accountability and accessibility for end users.

Benefits: Reduced Compliance Risk, Improved Transparency, Proactive Equity Work

Embedding ADA and Complete Streets coordination in a dynamic dataset offers several benefits:

- **Reduced Compliance Risk:** Up-to-date inventories reduce the likelihood of missing federally mandated requirements.
- **Transparency:** Interactive dashboards provide clear, accessible information to both internal teams and the public, building trust.
- **Proactive Equity:** By linking barriers to demographic and land use data, WSDOT can identify underserved communities where accessibility gaps have disproportionate impacts.
- **Efficiency:** Data updates at project completion eliminate redundant surveys and reduce the workload on ADA coordinators and project coordinators moving through project compliance stages.

Future Pilot Proposal: Shared ADA Data Dashboard Pilot with One Region

We propose a future pilot of this approach within one WSDOT region where ADA transition planning is already active. The pilot would involve:

- Building a shared dashboard that integrates OS-CONNECT pedestrian data with ADA compliance attributes (e.g., curb ramp slope, crosswalk signalization).
- Populating the dashboard with existing inventories and updating it with as-built data from new projects.
- Testing usability with ADA coordinators, engineers, and community partners.

Associated goals would include assessing whether providing the informational dashboard reduces redundant data collection, improves transparency and public engagement, and whether it helps prioritize investments more equitably.

The specifications and technical details for how OS-CONNECT data is structured, maintained, and linked to ADA reporting requirements are provided in the Appendix. At this stage, the focus is on testing the feasibility and value of a shared, dynamic ADA coordination tool.

5. Proposed Pilot for Opportunity 1: Process and Enabling Tooling

This section is a proposal suggesting how WSDOT can operationalize lifecycle stewardship for pedestrian right-of-way (PROW) data with minimal disruption to existing practices. It formalizes a three-handshake process inside project delivery, the tooling that enables it, a pilot structure with roles and timeline, governance and accountability requirements, a metric data dictionary for evaluation, and a three-year roadmap for scale-up. The design is grounded in the WSDOT sub-study's interview evidence and in the simplified process flows co-developed with WSDOT partners.

Process Overview: Three Digital Handshakes Inside Project Delivery

Objective: Create three low-friction “touch points” that ensure authoritative pedestrian data is present at scoping, validated at design, and updated at closeout—where the study shows risk is greatest (governance/approval/update).

Pilot Implementation Proposed Approach

Scope. Two WSDOT regions, three to five active projects (include at least one design–bid–build and one design–build). Select at least one corridor-scale project to test corridor analytics frequently requested in interviews. 1

Entry criteria. Projects must (a) begin scoping or design within three to six months, (b) name a Project Engineer (PE) and Data Steward, (c) agree to post-construction digital verification (H2) and as-built + ADA attachments (H3), and (d) allow limited staff time for onboarding.

Identified path: Three handshakes were identified as the optimal workflow for integrating project-informed updates to the OS-CONNECT dataset. Interviews identified reactive ADA triggers, manual merges, lack of standardized handoffs (PDF/Excel), and inconsistent closeout updates; the simplified three handshake flow explicitly supports upstream visibility and downstream updates.

Handshake 1 — After Scoping (context map submission).

The Project Manager (PM) or Project Engineer (PE) submits a map-based intent: links, nodes, and features expected to change (e.g., sidewalk segments, curb ramps, crossings). Purpose: prime provenance (what is changing) and establish a project identifier for downstream updates. The study's workflow notes show that early visibility reduces late ADA surprises and improves coordination.

Handshake 2 — After Construction, before Closeout (digital verification of what was built)

Once construction is substantially complete, the PE (or contractor on behalf of the PE) submits a structured digital form packaged as a GIS exchange- a compact record of the constructed features and key attributes (not a PDF). A proposed pipeline tool parses these responses into OS-CONNECT-compatible features, producing a pre-closeout delta ready for validation. This step is introduced (after construction) to: (1) minimize discrepancies introduced by late design changes, (2) avoid manual re-entry and PDF-only submissions, and (3) ensure the as-built representation is machine-readable before final publication. Interviews repeatedly cited manual post-processing and

format fragmentation as bottlenecks; this handshake directly addresses those pain points by standardizing the constructed-state handoff.

Enabling tooling for Handshake 2. The digital verification can be implemented with **TCAT tools** to capture standardized, **post-construction** responses and package them directly for OS-CONNECT/TDEI ingestion—supporting **in-field integration** by contractors and PE teams. This reduces later reconciliation effort and keeps attributes to graph/topology requirements noted in the study.

Handshake 3 — Closeout (as-built + ADA verification)

After Contractor/PE uploads digital response features in Handshake 2, the pipeline allows WSDOT to further attach ADA verification artifacts (e.g., MEF documentation, inspection forms, photos) to the changed features. The Data Steward validates schema/provenance and pushes to the authoritative inventory. Evidence highlights that post-construction updates are irregular, PDF-based, and frequently corrected via aerials; this handshake formalizes the update step with audit trails.

The workflow put together

Together, Handshakes 1–3 insert provenance at scoping, post-construction digital verification before closeout, and validated publication. This is where the study surfaced gaps: reactive ADA, manual merges, ad-hoc PDF/Excel handoffs, and inconsistent closeout updates. The simplified process flows, co-developed with WSDOT partners (staff?) reflect this same progression and support repeatable, auditable operations.

We summarize the above in a Project Flow image- Three Digital Handshakes.

- Handshake 1: Context map (after scoping, early provenance)
- Handshake 2: Digital verification (after construction, pre-closeout)
- Handshake 3: As-built + ADA verification (at closeout; authoritative publish)

WSDOT Project Flow — Three Digital Handshakes



Figure 3. WSDOT Proposed Project Flow with Three Digital Handshakes (Scoping, Design CAD, Closeout As-Built).

Proposed Tooling

TDEI for ingestion/validation (schema checks, LRS/XY reconciliation, topology) and publish.

OS-CONNECT for canonical schema (ownership, provenance), aligning with the design-grade ambitions while accommodating presence/absence where capacity is constrained.

AVIV ScoutRoute (H2) for standardized digital verification and packaging.

Proposed Implementation Aids

To support day-to-day execution of the three-handshake workflow in the pilot, the [Appendix B: Pilot Tables](#) (P1–P7) provides ready-to-use, fillable tables and checklists. These tables identify who does what and when (RACI alignment), what to submit at each handshake (H1/H2/H3), what the Data Steward must validate before publication, and how pilot success will be measured (metric data dictionary). They are designed for operational use from project onboarding, submission review, validation, to closeout and reporting, and will help teams avoid ad-hoc handoffs (for instance, through PDF/Excel). Our team suggests evaluating the outcomes with evaluation metrics described below to assess success in reducing manual re-entry, and ensuring that authoritative updates are complete, traceable, and on time. Readers implementing or auditing the pilot may refer to [Appendix B](#) when planning responsibilities, preparing submissions, validating data, and compiling pilot results.

Why This Pilot Design Matches the Evidence

Interviews cited reactive ADA, manual merges, PDF/Excel handoffs, LRS/XY drift, uneven capacity, and irregular closeout updates; the pilot inserts provenance at scoping, post-construction digital verification, and validated publish at the authoritative layer.

The simplified flows shared by WSDOT partners explicitly support upstream visibility and downstream updates, which this pilot implements as H1–H3 under the heading “Pilot Implementation Proposed Approach” found in section 5 below.

6. Governance and Accountability

Interview evidence indicates governance, and updates, are the data life-cycle phases that are least supported within the institution in the current process, not collection alone. We used a RACI (Responsible, Accountable, Consulted, Informed) analysis to demonstrate that evidence matches this conclusion. A RACI analysis helps remove ambiguity at a project closeout and establishes who must do what to reach authoritative publication of a dataset. The pilot therefore codifies RACI and lightweight policy hooks at closeout. In [Appendix D](#) we explain what a RACI analysis is.

Roles in our interviewee scope naturally fell into a RACI analysis as follows:

- **Project Engineer (PE)** – project delivery lead; ultimately accountable for the completeness and correctness of the post-construction digital verification (H2) and the final submission at Closeout (H3).
- **Data Steward** – responsible for validation and publication: schema & attribute checks, LRS/XY reconciliation, lineage (source/date/submitter), and ADA documentation linkage before data is published.
- **ADA Coordinator** – consulted on ADA verification (e.g., MEFs, inspection forms, conformance interpretations).
- **Planner** – informed as primary consumer; uses published data for prioritization/equity/safety analysis.

Interview Interpretation

At H2 (post-construction), the PE (or designee) supplies a GIS exchange (not PDF) so validation is machine-readable before closeout—addressing the study’s manual re-entry and format fragmentation complaints.

At H3 (closeout), the Data Steward publishes only after schema/spatial/lineage/ADA checks pass. This replaces irregular, PDF-based updates and post-hoc aerial corrections with a repeatable audit trail

Table 3: RACI Analysis for Project Administration and Sidewalks Data Updates.

Evidence basis: governance/approval/update repeatedly identified as least-supported data life cycle stages in the current institutional processes; H2/H3 standardize the handoff and formalize closeout publication. Please see [Appendix D](#) for RACI definitions.

Phase	Responsible (R)	Accountable (A)	Consulted (C)	Informed (I)
H1 – Context map	PM/PE	PM	Data Steward, ADA	Planning
H2 – Digital verification (post-construction)	PE/Contractor	PE	Data Steward, ADA	Planning
H3 – Closeout (as-built + ADA verification & publish)	Data Steward (validation/publish)	PE (submission & completeness)	ADA, Contractor	Planning, Public (via open data)

Suggested Closeout Policy Hooks

- **Contract closeout clause:** “As-built pedestrian features and ADA verification (MEF/inspection docs) must be submitted in the approved digital package before final acceptance.”
- **Validation SOP:** Data Steward confirms schema, coordinate/LRS reconciliation, lineage, and attachment links prior to publish.
- **Publish-and-explain page:** public metadata (scope, currency, known gaps) consistent with interview emphasis on transparency and trust.

Pilot Evaluation Metrics

Interviewees repeatedly asked for auditable, operationally meaningful measures that connect to real workflows (timeliness, parity, ADA fixes, access benefits, provenance). Below are pilot-scale definitions, formulae, cadence, and caveats.

M1: Update Timeliness

Definition: Days from substantial completion/closeout to publish date in OS-CONNECT.

Formula: $\text{date}(\text{publish}) - \text{date}(\text{closeout})$ (report median & P90 by region).

Cadence: Monthly; per project class.

Source: TDEI logs; closeout certificate.

Caveats: Track reason codes for delays (awaiting MEF, coordinate fixes).

Update timeliness (days from project closeout to dataset update).

M2: Coverage Parity

Definition: Relative attribute completeness (e.g., width, slope, landing, crossing type) for rural vs. urban pilot extents.

Formula: $(\text{complete_attribute_count} / \text{eligible_features})$ by geography; parity index = rural/urban.

Cadence: Quarterly.

Source: OS-CONNECT feature tables; Census/region geographies.

Caveats: Presence/absence only areas get flagged; annotate gaps.

M3: Late ADA Corrections

Definition: Count and % of projects with ADA non-compliance identified after Construction (i.e., during H2/H3) that requires rework.

Formula: $\text{count}(\text{ADA_findings_post-construction}) / \text{total_projects}$.

Cadence: Quarterly.

Source: ADA review logs; MEF register; inspection attachments.

Caveats: Separate planned MEFs from late findings; report both.

M4: Access Gain per Dollar

Definition: Marginal change in modeled pedestrian access (walkshed/population reach under constraints) per dollar.

Formula: $(\text{access_after} - \text{access_before}) / \text{project_cost}$.

Cadence: 30% design and post-publish.

Source: OS-CONNECT network; graph tools; project cost.

Caveats: Publish mobility profile parameters (e.g., slope limits, curb-ramp logic).

M5: Provenance Completeness

Definition: % of updated features with source/date/submitter populated and, when applicable, MEF/inspection attachments linked.

Formula: $\text{features_with_all_provenance_fields} / \text{features_updated}$.

Cadence: Monthly.

Source: TDEI validation reports and OS-CONNECT schema fields. Provenance completeness (features with source + date).

Proposed Pilot Project Timeline (12 months)

Table 4 shows the proposed 12-month timeline for the pilot project.

Table 4. Proposed Pilot Project Timeline

Month	Milestone	What Happens
0–1	Onboard and configure	Name PE/Data Steward/ADA; finalize H1/H2/H3 templates; configure AVIV ScoutRoute; stand up ingestion/validation in TDEI.
2	Dry-runs	Test H1 (context map) on two pilots; test H2 packaging; verify schema/LRS & provenance logging; correct submission friction.
3–4	Go-live H1	Submit context maps; establish project IDs; begin monthly validation reports; resolve early issues.
5–7	Construction phase	Monitor; record field changes; prep for H2 ; pre-stage attribute mapping for OS-CONNECT.
8	Go-live H2 (post-construction)	Submit digital verification (GIS exchange); run automated parsing and deltas; return fix-hints for any schema/LRS or topology failures.

Month	Milestone	What Happens
9	H3 Closeout	Attach MEF/inspection artifacts; Data Steward validates schema, spatial reconciliation, provenance; publish to authoritative inventory.
10	First evaluation pass	Report M1–M5; identify bottlenecks (e.g., recurrent coordinate drift, missing ownership); implement SOP adjustments.
11–12	Pilot report & scale plan	Finalize SOPs; propose policy hooks and contract language; identify next regions and datasets (e.g., composite crossing layer).

Exit Criteria (Go/No-Go)

The targets include timeliness (M1 median ≤ 30 days), provenance (M5 $\geq 95\%$), and Late ADA (M3 trending downward), along with a parity target for at least two critical attributes and documented SOPs for H1, H2, and H3. These targets reflect study findings on where the data lifecycle breaks down and how it can be repaired.

7. Roadmap and Next Steps

Implementation of the proposed pilot will meaningfully improve the availability, usability, and consistency of pedestrian infrastructure data within WSDOT workflows. However, the findings from this study indicate that tooling and process improvements alone are insufficient unless accompanied by a broader conversation about data stewardship and long-term accountability.

Across interviews, stewardship gaps emerged most clearly after data collection, particularly during approval, publishing, updating, and closeout. Pedestrian data is often generated through projects, but responsibility for maintaining it over time is unclear or inconsistently assigned. Project closeout rarely results in updates to authoritative datasets, and ADA related data frequently operates in parallel systems rather than flowing through shared lifecycle processes. As a result, datasets quickly become outdated, difficult to trust, and burdensome to reuse.

The study also highlights that stewardship is not simply a technical function. Interviewees emphasized the importance of having a trusted steward who enables non-technical users, such as planners, ADA coordinators, and program managers, to confidently rely on pedestrian data for decision making. Where stewardship is weak or fragmented, staff compensate through manual validation, ad hoc analyses, or complaint driven workflows, increasing both risk and inefficiency.

As a next step, the pilot should be paired with a focused stewardship strategy (see Appendix C for various scenarios). This includes clarifying ownership and accountability at key lifecycle stages, especially closeout and update; establishing minimum metadata; publishing and explaining practices to support transparency and trust; and aligning pedestrian data stewardship with existing governance structures used for roadway assets and ADA compliance. Advancing this conversation alongside the pilot will ensure that pedestrian data remains current, credible, and operationally useful over time.

8. References

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Appendix A - Interview Protocol

Introduction: ~3-5 minutes

1. Can you describe your professional background and your current role within WSDOT?
2. How does your role intersect with data management or ADA compliance?

Common Requirements and Key Features: ~10 minutes

At the core, the OS-CONNECT dataset (the output of the proviso funding to create a sidewalks inventory and accessibility mapping dataset) will include the following essential entities and attributes of these entities:

Table A-1 Core OS-CONNECT Collection Attributes

Number in Figure 1	Feature	Notes
1	sidewalks	Presence of a sidewalk, in a LineString format.
2	crossing	LineString crosswalk. Linestring extends from point on a curb-to- point on a curb on the opposing side of the street.
3	links	LineString - between crosswalks and sidewalks
4	crosswalk-markings	LineString - crosswalk type, and markings on it. Marked vs unmarked are available values
5	Curb locations	Point feature to express a point joining the street environment and sidewalk environment
6	Curb ramps	Point features, with lowered, raised, or flush where possible
7	Path incline	Elevation change and direction of the elevation change, as perceptible from USGS data
8	sidewalk-width	Path width with .5m tolerance level
9	Path length	Path length with 0.5m tolerance level

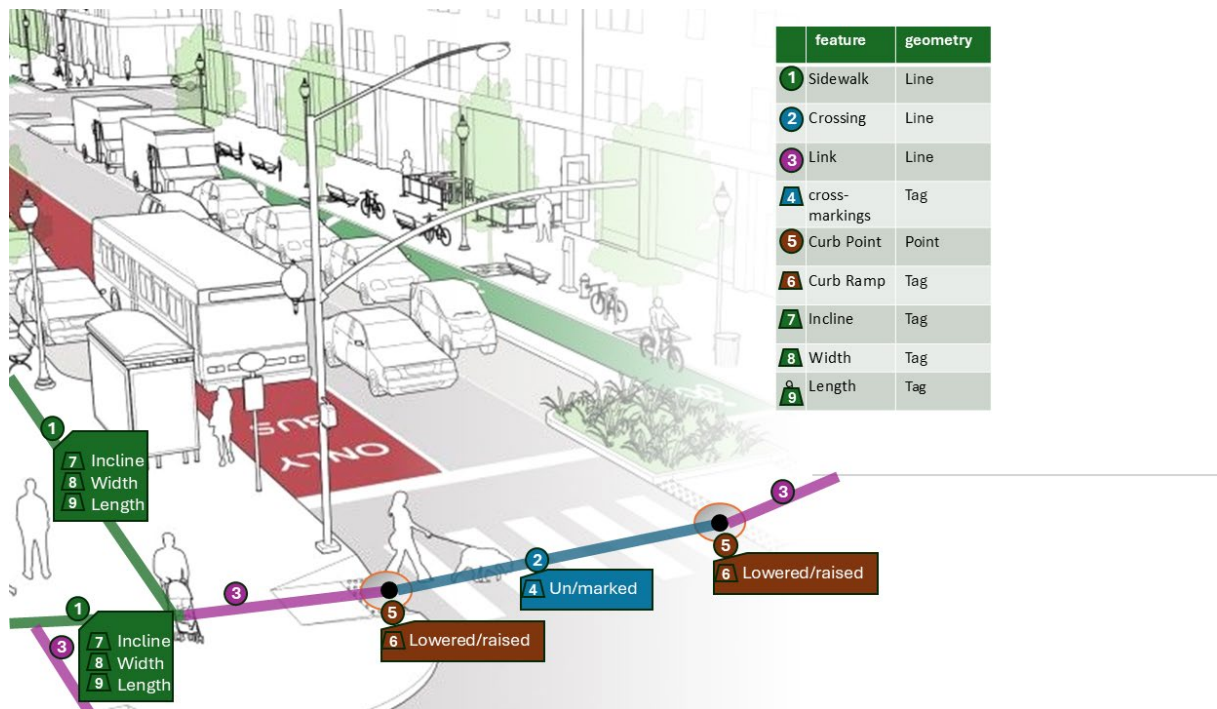


Figure A-1. Graphical Schematic of the OS-CONNECT Dataset.

Includes the line and point geometries represented in the data and attributes associated with each geometric entity.

1. Are there other attributes you think **MUST** be included in a sidewalk dataset?
2. Can you describe scenarios where specific features or data elements were crucial for your analyses?
3. Are there current datasets you use that meet these requirements? Are there significant gaps?
4. Are there additional elements you believe would enhance your analyses that are currently missing?

Data Quality Aspects: ~10 Minutes

1. How do you evaluate or decide on the current quality or completeness of a dataset you are about to use?
2. Could you share examples where data quality or completeness issues either helped or hindered a project?
3. Which aspects of data quality—such as accuracy, completeness, or compatibility—are most critical for your projects? Why?

Functionality and Customization

1. What are the specific tools and methods that you rely on for managing or using data and what modifications would you like to see to make them more effective for you?

Merging Data Sets: ~5-7 Minutes

1. How do you currently integrate sidewalk data with road network data? What are some challenges that arise?

2. What challenges do you face in merging different datasets when trying to analyze or visualize two or more datasets together?
3. Are there common integration requirements that stand out in your work?
4. What are the primary use cases or processes in which you may merge data? Are there any processes that you are unable to perform without merging different data sets?

General Compliance and Barriers: ~3-5 Minutes

1. How do you prioritize and address ADA compliance issues in your work?
2. When planning a project, how do you prioritize the removal of accessibility barriers in the public right of way (e.g. utility poles, street signs)?

Inventory Reporting and Management: ~5-7 Minutes

1. Do you currently collect and manage data on infrastructure like ramps and sidewalks? If so, describe that process.
2. How do you prioritize which data elements to include or focus on during data collection?
3. How do you prioritize improvements to specific assets like sidewalks, crossings or ramps? What data informs this prioritization?
4. What tools or methods are most effective for inventory management in your experience?
5. Are there specific changes you would like to see in your tools or methods for data visualization and reporting?

Closing: ~10 Minutes

1. I was wondering if you got a chance to look at the demo we shared? What are your thoughts on that? [if not, we'll take a couple of minutes to watch it together]
2. Based on our discussion, are there any areas you would like to revisit or emphasize further?
3. Do you have additional thoughts or suggestions for improving data processes and tools, specifically for sidewalks data?
4. Is there anything else you'd like to share that we haven't covered?

Appendix B - Pilot Tables and Implementation Aids

This appendix suggests how the proposed pilot process can be workflow-ready via actionable tools for the pilot. Tables P-1–P-7 are intended to be filled out and used by regional project teams, Data Stewards, ADA Coordinators, and Planning staff. They (1) record the pilot roster and roles (P-1), (2) standardize submission checklists for Handshakes H1/H2/H3, later to be used as forms in the digital inputs for OS-CONNECT, (3) define publish-gate validations for the Data Steward (P-3), (4) document provenance fields required for authoritative updates (P-4), (5) specify pilot evaluation metrics with formulas and cadence (P-5), (6) track risks and mitigations (P-6), and (7) ensure MEF/inspection artifacts are correctly attached to features at closeout (P-7). Use these tables to plan, execute, and verify each step so that project-informed updates to OS-CONNECT are consistent, auditable, and timely throughout the pilot.

Table P-1. Pilot Roster and Responsibilities (by Project)

Purpose

Tracks who is participating in each pilot project and how responsibilities align with the three handshakes.

Column Headings and Meaning

- Region – WSDOT region participating in the pilot.
- Project ID – Unique identifier tied to the contract and OS-CONNECT ingestion.
- Corridor / Location – Route segment, mileposts, corridor, or project limits.
- Delivery Method (DBB/DB) – Whether the project is Design-Bid-Build or Design-Build.
- PE (A) – Project Engineer who is Accountable for H2 and H3 submissions.
- Data Steward (R) – Person Responsible for validation and publication.
- ADA Coordinator (C) – SME Consulted on ADA documentation, MEFs, and inspections.
- Contractor Rep (C) – Field representative who may prepare H2 digital verification inputs.
- Planning POC (I) – Planning staff Informed once the dataset is updated.
- H1 Date – Date context map was submitted.
- H2 Date – Date post-construction digital verification was submitted.
- H3 Date – Date as-built + ADA verification was completed.
- Notes – Free text for special conditions (corridor pilot, complex interchange, etc.).

Table P-2. Submission Checklists for H1, H2, H3

Purpose

Ensures each handshake includes the required artifacts in correct formats.

P-2a. H1 - Context Map (After Scoping)

Columns

- Required Item – Name of the needed artifact (project ID, intended changes map including sidewalks, curbs, crossings, metadata).
- Description – What the item represents (scope, affected OS-CONNECT features, limits).
- Format – Acceptable formats (Geojson OpenSidewalks, JSON metadata).
- Pass Criteria – Minimum requirements for acceptance.

P-2b. H2 - Digital Verification (Post-Construction, Pre-Closeout)

Columns

- Required Item – Constructed features, topology checks, OS-CONNECT ID reconciliation.
- Description – Expected content (forms filled out for the built geometry + attributes).
- Format – changeset in OS-CONNECT workspace; auto-QA leaderboard report for checks.
- Pass Criteria – Parsing success, schema validity, topology/lane alignment tolerance.

P-2c. H3 - Closeout (As-Built + ADA Verification & Publish)

Columns

- Required Item – As-built confirmation, ADA verification, publish checklist outside of OS-CONNECT, within-workspace validation of the changeset.
- Description – Final feature changeset reference id + ADA documentation.
- Format – GIS exchange + attachments (PDF/JPG/PNG).
- Pass Criteria – All validation gates satisfied.

Table P-3. Validation Gates (Publish Prerequisites)

Purpose

Specifies what the Data Steward must check before publishing updates to OS-CONNECT.

Column Headings

- Gate – Name of the validation category (Schema, Spatial, Topology, Lineage, ADA Docs).
- Check – What is being examined (required fields, coordinate alignment, ramp/crosswalk topology).
- Method – How the check is performed (auto-QA, leaderboard check, Workspaces check, manual spot review).
- Pass Criteria – Conditions for approval (e.g., all mandatory fields present, LRS alignment within tolerance).
- Exception Handling – What happens if it fails (return to PE with fix-hints; require MEF, etc.).

Table P-4. Provenance Field Dictionary

Purpose

Defines the metadata needed to ensure all updated features are traceable.

Column Headings

- Field – Name of the provenance field (source, collection_date, submitted_by).
- Description – What the field captures (origin, method, contributor).
- Required – Yes/No; whether the field must be populated before publish.
- Type – Data type (text, enum, array, date).
- Example – Illustrative sample to guide users (e.g., “H2_postconstruction_PE” or “2026-06-15”).

Table P-5. Metric Data Dictionary (Pilot Evaluation Metrics)

Purpose

Defines how each pilot metric is calculated, what data sources it uses, and how often it is reported.

Column Headings

- Metric – Name of the performance indicator (timeliness, parity, late ADA corrections...).
- Definition – Operational meaning of the metric.
- Formula – Exact calculation method.
- Cadence – How frequently it is measured (monthly, quarterly).
- Sources – Which systems or artifacts provide the inputs (TDEI logs, OS-CONNECT tables).
- Caveats – Interpretation notes (e.g., AI-generated slope approximations or MEF exceptions).

Table P-6. Pilot Risk Log

Purpose

Tracks operational risks surfaced during the pilot and assigns owners and mitigations.

Column Headings

- Risk / Issue – Short description of the risk (OS-CONNECT & LRS drift, PDF/Excel reversion, missing attachments) [this is a very hard one to track, but nice to have]
- Prob. – Probability level (Low/Med/High).
- Impact – Impact level (Low/Med/High).
- Mitigation – What will be done to address or prevent the issue.
- Owner – Role responsible for mitigation (PE, Data Steward, ADA, Planning).
- Status – Open, in progress, resolved.

Table P-7. MEF/Inspection Attachment Matrix

Purpose

Ensures ADA documentation is complete, standardized, and correctly linked to features.

Column Headings

- Document Type – MEF justification, field inspection forms, photos, notes.
- Required Fields – Metadata required for each item (feature ID, date, signer, measure set).
- File Type – Acceptable formats (PDF, JPG, PNG, TXT).
- Linkage – Whether and how the document is linked to individual features (e.g., doc_links[]).
- Retention – Minimum retention period (e.g., project + 6 years).
- Notes – Additional context (night photos allowed, worst-case measure required).

Appendix C - Stewardship Scenario Models

Table C-1. Stewardship Scenarios Summary Table

	Scenario Name	Definition	Primary Characteristics	What This Is	What This Is Not
1	Data Handoff / Reference Use	WSDOT receives the pedestrian datasets produced under TDEI and incorporates them into existing internal systems as reference data, without adopting or operating the supporting infrastructure.	• Static or periodic data delivery • Ingest into ArcGIS or internal repositories • No ongoing system operation • Minimal process change	A traditional data delivery and ingestion model aligned with existing GIS workflows.	Not a lifecycle system; not a refresh mechanism; not a shared platform.
2	System Transition / Internal Stewardship	WSDOT assumes ownership and operation of the open-source OS-CONNECT infrastructure, managing updates, validation, and data refresh cycles internally or through contracted support.	• Waterfall transition of code and tooling • WSDOT-managed Workspaces and AVIV ScoutRoute instances • Periodic statewide imagery refresh via procurement • Internal QA/QC processes	A full operational handoff where WSDOT becomes the system steward.	Not a vendor-hosted service; not externally governed; not community-operated.
3	Federated Stewardship / Shared Ecosystem	WSDOT participates as a principal stakeholder in a shared, open data ecosystem where OS-CONNECT infrastructure is maintained collaboratively, and multiple entities contribute to updates, validation, and use.	• Shared governance model • Distributed data contribution • Centralized standards and validation • Multiple consuming applications	A collaboratory model that separates stewardship, contribution, and consumption roles.	Not loss of authority; not unmanaged crowdsourcing; not tool anarchy.

Appendix D - RACI Analysis

A RACI analysis is a widely used project-governance tool that clarifies who does what in a multi-stakeholder process. The acronym RACI stands for:

Table D-1. Explanation of Acronym RACI

Letter	Term	Definition
R	Responsible	The role(s) that perform the work. These individuals complete the task, analysis, or deliverable. There may be several “R” roles for a given step.
A	Accountable	The role that owns the outcome and is the final decision-maker. There must be exactly one “A” per task. This person signs off and is ultimately answerable for whether the step is completed correctly.
C	Consulted	People who provide input before the work is finalized. They are not doing the task but are needed to ensure correctness, consistency, or compliance. Communication with “C” roles is two-way.
I	Informed	People who need to be kept aware of progress or results but do not contribute directly. Communication with “I” roles is typically one-way (notification).

Why RACI Is Used in This Pilot

The WSDOT study clearly identified that major workflow gaps occur not during data collection, but at governance, approval, and update points, especially around:

- inconsistent post-construction updates,
- unclear handoff expectations (PDF/Excel variability),
- uneven ADA documentation practices,
- demarcation problems between PE, ADA, Data Steward, and Planning roles, and
- no single “owner” for data publication.

A RACI chart addresses these problems by placing clear ownership and responsibilities at each step of the three-handshake workflow:

- Handshake 1 (after scoping),
- Handshake 2 (after construction, before closeout), and
- Handshake 3 (closeout: as-built + ADA verification + authoritative publish).

This prevents misunderstandings about who submits, who validates, who approves, and who publishes.

When Viewing a RACI Table

Look first at the A column. That tells you who owns the step and cannot be duplicated.

Next, the R column. These are the people who actually do the work.

Then the C column. These are the subject-matter experts—e.g., the ADA Coordinator—who must be consulted before the step is considered complete.

Finally, the I column. These roles receive updates but do not participate in the task.

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